

Work Plan for Fiscal Year 2007 Draft October 1, 2006 (revised November 13, 2006)

I. **Program Title:** CVPIA § 3406 (b)(12), Clear Creek Restoration

II. **Responsible Entities:**

	Agency	Staff Name	Role
Lead	Reclamation	Jim De Staso	Program Manager
Co-Lead	USFWS	Matt Brown	Program Manager

III. **Program Objectives for FY 2007:**

- A Restore stream channel form and function necessary to optimize habitat for salmon and steelhead, and the aquatic and terrestrial communities on which they depend.
- B Determine long-term flow needs for spawning, incubation and rearing by conducting an IFIM study as mandated in Section (b)(12).
- C Provide flows of adequate quality and quantity to meet the requirements of all life stages of Chinook salmon and steelhead trout known to use Clear Creek.
- D Provide spawning gravel to replace supply blocked by Whiskeytown Dam.
- E Monitor project results.

Source documents supporting each of the above objectives include: 1) CVPIA Section 3406 (b)(12); 2) Record of Decision, Central Valley Project Improvement Act; 3) CALFED Bay-Delta Programmatic Record of Decision, proposed Ecosystem Restoration Program stage 1 actions; 4) CALFED Ecosystem Restoration Program Strategic Plan For Ecosystem Restoration, action 3, page D-23; 5) Biological Opinion, Effects of the Central Valley Project and State Water Project Operations from October 1998 through March 2000 on Steelhead and Spring-run Chinook Salmon; and 6) Biological Opinion on the Long-Term Central Valley Project and State Water Project Operations Criteria and Plan, October 2004.

IV. **Status of the Program:**

The Clear Creek Coordinated Resource Management Planning group (CRMP) and the Clear Creek Technical Team (Technical Team) work directly with local entities to achieve program objectives. The CRMP and the Technical Team are comprised of local landowners, agency representatives and stakeholders. The groups have been meeting since 1995 to plan, implement, and monitor restoration projects using a multi-disciplinary restoration approach. The Technical Team is made up of expertise from the Fish and Wildlife Service, Reclamation, Bureau of Land Management, Western Area Power Administration, Natural Resource Conservation

Service, National Park Service, National Marine Fisheries Service (NMFS), California Department of Fish and Game, California Department of Water Resources, Regional Water Quality Control Board, Shasta County Department of Education, City of Redding, Central Valley Project Water Users, Sacramento Municipal Utilities District, the Western Shasta Resource Conservation District, Point Reyes Bird Observatory, and the Horsetown Clear Creek Preserve. The Technical Team discusses and reviews proposed restoration actions and monitoring data to assist program managers in program management. The Technical Team uses an adaptive management approach to improve learning through active experimentation. Many of the projects are implemented by the Western Shasta Resource Conservation District with technical assistance from more than a dozen Federal, State and local agencies.

Clear Creek Restoration Program actions are specifically mandated by the CVPIA. In addition, the CVPIA Anadromous Fisheries Restoration Program Plan, the CALFED Strategic Plan for Ecosystem Restoration, and the Record of Decision for the CALFED Bay-Delta Program all call for similar actions on Clear Creek, some of which have already been implemented such as removing Saeltzer Dam, filling instream and floodplain mining pits, and refining and implementing a watershed management plan to reduce the transport of fine sediment to the creek. Continuing actions from the ERP plan include: a) implementing large-scale restoration projects; b) evaluating the need to augment flows through IFIM; c) providing channel maintenance high flows with the CBDA Environmental Water Program, and increasing minimum stream flow; and d) augmenting the supply of spawning-sized gravel.

Objective A: The Stream Channel Restoration is a construction project designed to restore a functional floodplain and increase salmonid spawning and juvenile rearing habitat in a 2 mile section of creek. This section of creek was significantly degraded by gold and aggregate mining that resulted in essentially no spawning or rearing habitat. Four stream channel improvement projects were completed, in 1998 (Phase 1), 1999 (Phase 2A), 2001 (Phase 2B) and 2002 (Phase 3A). Construction of the four previously mentioned Phases has resulted in the restoration project being approximately 50 percent completed.

CALFED funding was awarded for construction of Phase 3B, and the Technical Team is currently discussing the need to construct Phase 3C. The decision to construct Phase 3C will be based on analysis of costs and benefits and availability of funding. Funding for future phases had not been forthcoming from CALFED since the 1998 PSP due to concerns over the large scale and costs of the project, the desire for more explicit and active adaptive management, and the potential for negative impacts from mercury. In response to these concerns, the Technical Team designed smaller, less expensive projects (Phase 3A was funded by cost savings achieved in the two previous phases), participated in the Adaptive Management Forum, and coordinated with experts conducting mercury studies.

Recent reports available from USGS and University of Montana have shown that elevated mercury levels in the watershed are not associated with restoration

activities and that restoration activities have not been shown to have negative impacts. A Mercury Synthesis and Data Summary Report for Lower Clear Creek: Shasta County, CA was completed by Tetra Tech Inc, in December 2005 using CVPIA funds from FY 2004.

Objective B: The CVPIA mandated the development and use of an Instream Flow Incremental Methodology (IFIM) study to determine flows from Whiskeytown Dam to allow sufficient spawning, incubation, rearing, and outmigration for salmon and steelhead. The IFIM study was estimated to cost \$1.2 million in FY2001, but due to delays, was not initiated until FY2004. The FWS Sacramento Fish and Wildlife Office IFIM program will perform the majority of the IFIM field work in FY 2006 through completion in FY 2009.

The current instream flow prescription for the creek, based on 1982 and 1983 conditions, needs updating to include: temperature concerns; analysis of barriers to fish passage; recent developments in minimum flow setting methodology; and changes in the stream channel that have been ongoing since Whiskeytown Dam was closed in 1963. IFIM methods now include more appropriate 2-dimensional hydraulic models and additional habitat suitability criteria, the two main elements used to calculate the amount of habitat created by different flows. Advancements in juvenile habitat suitability criteria related to adjacent flow velocities, and the use of cover will produce different flow recommendations for juveniles than the old study. In addition, the new IFIM will develop Clear Creek-specific habitat suitability criteria specifically for spring Chinook and steelhead. Generalized fall Chinook criteria were used for spring Chinook in the 1983 IFIM. We now know that spring and fall Chinook have different life histories and habitat requirements. The new criteria will improve not only Clear Creek flow management but also efforts for the recovery of threatened spring Chinook and steelhead on other Central Valley regulated streams.

Since the original IFIM was developed, Saeltzer Dam was removed, opening up 12 miles of the 18 miles of lower Clear Creek and allowing re-establishment of two threatened species, spring Chinook and steelhead. The original IFIM did not adequately characterize the reach upstream of Saeltzer Dam. Very little data was collected upstream of the dam. The upstream reach has very different channel form and gradient than the lower reach. The differences in channel form and gradient are the major determinants of the flow-habitat relationship. In addition, removal of Saeltzer Dam has released large amounts of sediment that were stored upstream of the dam resulting in ongoing changes in stream habitat which have yet to be evaluated.

The new IFIM will also take into account instream channel geomorphology, which has changed since 1963. The Clear Creek stream channel has been changing gradually since Whiskeytown Dam was closed in 1963. The channel has been resized to the reduced flows, and riparian vegetation has fossilized parts of the stream channel resulting in a degraded channel cross-section. Some reaches of the creek have incised and degraded due to the reduction in sediment supply caused by Whiskeytown Dam. These changes have probably resulted in changes

in the optimal stream flow.

Objective C: Between 1996 and 2005, an average of 69,000 acre-feet of water per year has been provided by 3406(b)(2) to create spawning and rearing habitat and reduce water temperatures that are deleterious to salmon and steelhead. The targeted flow quantity may be revised pending results from the IFIM.

Clear Creek has experienced an average five-fold increase in fall Chinook spawning escapement over the 1967 to 1991 baseline period. The increase in fall Chinook escapement is largely attributable to higher minimum flows between October and June. The benefits of higher minimum flows between July and September for threatened spring Chinook and steelhead were demonstrated in rotary screw trap catches and in snorkel counts of adult spawners, carcasses, and their redds. While populations of these threatened species are small, they appear to be on an upward trend. A minimum viable population goal of 1,000 adult spring Chinook and steelhead has been established for the creek. In 2005, spring Chinook and steelhead population indices were 67 and 288, respectively. Growth of these populations will be limited by a lack of spawning gravel.

Objective D: Spawning gravel supplementation is a long-term need created by the construction of Whiskeytown Dam, which blocks gravel from moving downstream into the areas of Clear Creek where salmonids spawn. By the year 2020 the overall goal is to provide 347,288 square feet of usable spawning habitat between Whiskeytown Dam downstream to the former Saeltzer Dam, the amount that existed before construction of Whiskeytown Dam. Since 1996, spawning gravel has been augmented at two or more locations. Spawning gravel introductions have created high density spawning areas in areas once bereft of spawning gravel. The program is currently about 21 percent completed to date.

The 2001 Gravel Management Plan will continue to be revised in 2007 and will provide an overall gravel injection strategy for the creek including annual tons to be added and specific injection locations. The programs' interim target was 25,000 tons per year, but only an average of 3,318 tons were placed annually since 1996 due to lack of funding.

Objective E: Ongoing monitoring studies involve salmonid use of restored habitat, fish stranding and passage, juvenile salmonid out-migration, adult population estimates, redd mapping, neotropical migratory bird populations, riparian vegetation, wetlands, groundwater, stream flows, water temperatures, bedload movement, channel geomorphology, and spawning gravel quality. Monitoring is approximately 38 percent completed to date.

IV. FY 2006 Accomplishments:

1. Monitoring showed more than 400 percent average increase in spawning density in stream channel restoration project Phase 3A.
2. Monitoring indicated that channel-lowering (i.e., streambed elevation is dropping) in the stream channel proceeded upstream at least 1500 feet

- through phase 2A.
3. Designs and proposal for stream channel restoration project 3B submitted to CALFED were accepted for funding for Phase 3B (backbuster).
 4. Point Reyes Bird Observatory monitoring indicated that migratory songbird diversity and population sizes were increasing in the restoration area.
 5. Two dimensional modeling showed that construction of Phase 3C will result in a four to five-fold increase in spawning habitat.
 6. IFIM data collection for rearing habitat was completed in the upper half of the anadromous reach below Whiskeytown Dam.
 7. Flows were provided suitable for all life stages of anadromous salmonids.
 8. Fall Chinook escapement was the second highest on record.
 9. Threatened spring Chinook continue to repopulate upstream reaches.
 10. Threatened steelhead spawning continues to concentrate in injected spawning gravel.
 11. Completed the Clear Creek Decision Analysis Model to estimate the amount of annual gravel additions needed to maintain spawning gravel supply after the creek has been recharged to eliminate 43 years of accumulated gravel deficit.
 12. Constructed temporary barrier weir to prevent fall Chinook from hybridizing with spring Chinook.
 13. Added 2,700 tons of spawning gravel to the National Environmental Education (NEED) Camp site, and developed designs for Dog Gulch and Peltier Valley Road Bridge.
 14. Monitoring indicated that temperature criteria for spring Chinook spawning were exceeded for the majority of the spawning period but only by a biologically minor increment.
 15. Completed "Mercury Synthesis and Data Summary Report for Lower Clear Creek: Shasta County, CA."

v. Tasks, Costs, Schedules and Deliverables:

A Narrative Explanation of Tasks.

- 1 Program Management
- 2 Implement Clear Creek stream channel restoration project (objective A)
 - 2.1 Environmental compliance for Phase 3B construction
 - 2.2 Restore streambed elevation to previous phase of restoration upstream of Phase 3B
 - 2.3 Conduct riparian encroachment and geomorphology survey
- 3 Provide baseline flows for all life stages of anadromous fish, and pursue spring pulse flows (objective C)
 - 3.1 Recommend flows between June and September to maintain water temperatures that meet standards established by the NMFS for the protection of endangered spring Chinook and steelhead recommended to the CVPIA (b)(2) program.
 - 3.2 Recommend flows between October and May to provide spawning and

rearing habitat for Chinook and steelhead recommended to the CVPIA (b)(2) program.

- 3.3 Determine through IFIM study, long term flows needed to satisfy requirements of (b)(12) (objective B)
4. Implement spawning gravel augmentation and monitoring program (objective D).
 - 4.1 Implement gravel injections at Whiskeytown Dam, NEED Camp, Dog Gulch, Peltier Valley Bridge, Placer Road, Clear Creek Road Bridge and Above 3A
 - 4.2 Conduct field investigations to refine sediment transport model
 - 4.3 Revise Gravel Management Plan based on sediment transport model
5. Monitoring (objective E)
 - 5.1 Monitor anadromous fishery including juvenile salmonid use of restored habitats, fish stranding, adult population estimates, and redd mapping. Monitor stream flows, water temperatures, spawning gravel, and stream channel form. A report will be produced by the USFWS.

A. Schedule and Deliverables.

#	Task	Dates		Deliverable
		Start	Complete	
1	Program Management	10/01/06	09/30/07	
2.1	Environmental compliance for Phase 3B construction	10/01/06	09/30/07	Environmental assessment, biological assessment
2.2	Restore streambed elevation to previous phase of restoration	10/01/06	09/30/07	Completion report
2.3	Conduct riparian encroachment and geomorphology survey	10/01/06	09/30/07	Summary report and recommendations
3.3	Determine through IFIM study, long-term flows needed to satisfy requirements of (b)(12)	10/01/06	09/30/07	Summary report and recommendations
4.1	Implement gravel injections at Whiskeytown Dam, NEED Camp, Dog Gulch, Peltier Valley Bridge, Placer Road, Clear Creek Road Bridge and Above 3A.	10/01/06	09/30/07	Completion report
4.2	Conduct field investigations to refine sediment transport model	10/01/06	09/30/07	Summary report and recommendations
4.3	Revise Gravel Management Plan based on sediment transport model	10/01/06	09/30/07	Summary report and recommendations
5.1	Monitor anadromous fishery including juvenile salmonid use of restored habitats, fish stranding, adult population estimates, and redd mapping. Monitor stream flows, water temperatures, spawning gravel, and stream channel form.	10/01/06	09/30/07	Annual Report and recommendations for the future.

B. Summary of Program Costs and Funding Sources.

#	Task (responsible agency in parentheses)	Total Cost	Funding Sources	
			W&RR	RF
1	Program Management (Reclamation, USFWS)	\$100,000	\$50,000	\$50,000 (FWS)
2.1	Environmental compliance for Phase 3B construction (Reveg Phase 2A)	\$25,000	\$25,000	
2.2	Restore streambed elevation to previous phase of restoration upstream of Phase 3B (Cloverview)	\$100,000	\$50,000	\$50,000
2.3	Conduct riparian encroachment and geomorphology survey	\$0		
3.3	Determine through IFIM study, long-term flows needed to satisfy requirements of (b)(12) (USFWS)	From AFRP		From AFRP
4.1	Implement gravel injections at Whiskeytown Dam, NEED Camp, Dog Gulch, Peltier Valley Bridge, Placer Road, Clear Creek Road Bridge and Above 3A. (Reclamation)	\$350,000		\$350,000
4.2	Conduct field investigations to refine sediment transport model (GMA)	\$50,000		\$50,000
4.3	Revise Gravel Management Plan based on sediment transport model (GMA)	\$25,000	\$10,000	\$15,000
5.1	Monitor anadromous fishery including juvenile salmonid use of restored habitats, fish stranding, adult population estimates, and redd mapping. Monitor stream flows, water temperatures, spawning gravel, and stream channel form. (USFWS)	\$285,000		\$285,000 (FWS)
Total Program Budget		\$935,000	\$135,000	\$800,000

C. CVPIA Program Budget.

#	Task	FTE	Direct Salary and Benefits Costs	Contracts Costs	Miscellaneous Costs	Administrative Costs	Total Costs
1	Program Management						
	Reclamation	0.5	\$32,468			\$17,532	\$50,000
	USFWS	0.5	40,984			\$9,016	\$50,000
2.1	Environmental compliance for Phase 3B construction			\$25,000			\$25,000
2.2	Restore streambed elevation to previous phase of restoration			\$100,000			\$100,000
2.3	Conduct riparian encroachment and geomorphology survey			\$50,000			\$50,000
3.3	Determine through IFIM study, long-term flows needed to satisfy requirements of (b)(12)		From AFRP	From AFRP	From AFRP	From AFRP	From AFRP
4.1	Implement gravel injections at Whiskeytown Dam, NEED Camp, Dog Gulch, Peltier Valley Bridge, Placer Road, Clear Creek Road Bridge and Above 3A.			\$350,000			\$350,000
4.2	Conduct field investigations to refine sediment transport model			\$100,000			\$100,000
4.3	Revise Gravel Management Plan based on sediment transport model			\$25,000			\$25,000
5.1	Monitor anadromous fishery including juvenile salmonid use of restored habitats, fish stranding, adult population estimates, and redd mapping. Monitor stream flows, water temperatures, spawning gravel, and stream channel form.			\$185,000			\$185,000
	Total Program Budget						\$935,000

D. DRAFT CVPIA 5-Year Budget Plan FY 2008 – 2012 (\$ Thousands)

Program management costs estimated at \$100 per year

Stream Channel Restoration

		FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	Total (\$)
	W&RR						
	RF	\$125					
	State						
	Other- CALFED ERP	\$4,775					
Total:		\$4,900					\$4,900

Spawning Gravel Supplementation

		FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	Total (\$)
	W&RR	\$500	\$500	\$500	\$500	\$500	\$2,500
	RF						
	State						
	Other						
Total:		\$500	\$500	\$500	\$500	\$500	\$2,500

Adaptive Management and Monitoring

		FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	Total (\$)
	W&RR						
	RF	\$200	\$200	\$200	\$200	\$200	\$1,000
	State						
	Other CALFED ERP	To Be Deter mined	TBD	TBD			
Total:		\$200	\$200	\$200	\$200	\$200	\$1,000